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MATANUSKA VALLEY DAIRY FARMS

1953

ALASKA AGRICULTURAL EXPERIMENT STATION
Don L. Irwin, Director

In cooperation with the
UNITED STATES DEPARTMENT OF AGRICULTURE

SUMMARY

Over 10 million pounds of milk were produced in Alaska during 1953. Almost two-thirds of this was produced in the Matanuska Valley. Milk sales were greater than sales of any other farm product.

During the year 1953, dairymen increased herd size by an average of 3 milk cows. Most of this increase came from first calf heifers which brought with them lower milk production. About half of the dairy farmers sold over 125,000 pounds of milk per farm.

The average dairy farmer had 288 acres of which 104 were cropland. Dairymen had 4.6 acres per animal unit in feed crops. The trend in use of cropland was toward more hay, silage and pasture and less grain, potatoes and vegetables. Dairymen have been increasing their acreages of grass for hay and pasture. In 1953, 41 percent of the acreage cut for hay was a grass mixture.

Purchased feed was the greatest single expense. It amounted to about one-fourth of total expenses. Machinery purchases were second and labor was third. Fertilizer, the fourth largest expense, amounted to $8.50 per acre of cropland. Milk sales made up 88 percent of the cash income. The net returns from farming ranged from a loss of over $7,000 to a net gain of over $14,000. The average was $4,843. Fifteen dairymen realized over $6,000.

Fourteen farmers who realized a high net return from dairying had 7 more cows and sold 2,200 more pounds of milk per cow than the 14 farmers who had a low net return. Furthermore, they bought more fertilizer and realized more from each dollar spent for purchased feed.

Average cost of keeping one producing cow for the year, except for unpaid operator and family labor and interest on family capital, was $664.11. It cost an average of $7.97 to produce 100 pounds of milk. The range was from $4.07 to $13.97 per hundredweight per farm.

MATANUSKA VALLEY DAIRY FARMS

Richard A. Andrews 1/

Agricultural Economist

Dairying was the leading type of farming in the Matanuska Valley in 1953. Fifty-four farmers marketed 6,045,000 pounds of milk in 1953. Income from sales of milk exceeded that from any other farm commodity. More of the full-time farmers operate Grade A dairy farms than any other type of farm. Most dairy farms were started on colony tracts. As the herds grew, farmers increased the size of their farms and of their buildings. Many dairymen are limited in size of operation by the colony barn (32' x 32' x 32'). It is not easily remodelled into efficient units.

Most of the milk produced in the Matanuska Valley is consumed as fluid milk. As yet, there is an unfulfilled market for fluid milk on a year-round basis. During periods of peak production some cream is separated. It is doubtful that much milk ever will be manufactured into butter or cheese on a commercial basis. Returns to the producers would be too low and there are other dairy products which have a higher competitive value than butter or cheese.

This study was made to determine which farm practices influence income on Alaskan farms and to provide statistical and cost information useful for farmers considering possible future economic adjustments. Thirty-nine dairymen were interviewed in 1953. Changes in farm ownership made some reports less useful than others. The small number of records renders detailed analysis difficult. Exaggerating this problem are the varied types of farm operations among dairy farmers. By using several different approaches, a valid analysis can be made of certain major farm management problems on these farms.

1/ The author expresses sincere appreciation to farmers in the Matanuska Valley who gave of their time and resources to make this study possible. Also, sincere appreciation is expressed to the Matanuska Valley Farmers Cooperating Association and to the Alaska Dairy Products Corporation who contributed factual information on Alaskan production and to all members of the Agricultural Economics Department for their invaluable suggestions.

Size of Herd

Dairymen increased their dairy herds by about 3 cows per herd in 1953. Most of this increase was from first calf heifers. No widespread purchases of outside stock were made during 1953, although 2 farmers brought in about 25 head. Most of these were first calf heifers also. The average dairy herd on December 31, 1953, included 17 milk cows, 5 dairy heifers and 5 dairy calves (table 1). Dairymen had from 4 to 37 milk cows. Eight of the 39 dairy farmers had 10 cows or less, 9 had from 10 to 13, 5 had 14 to 16, 5 had 17 to 19 and 12 had 20 or more cows on December 31, 1953.

Table 1. Average numbers of livestock per farm December 31, and proportion of farms reporting specified kinds, Matanuska Valley, 1952 and 1953.

Item	Dairy farms		All farms	
	1952	1953	1952	1953
Number of farms	36	39	78	76
Kind of livestock		Average number per farm		
Milk cows	14	17	7	9
Dairy heifers	5	5	3	3
Dairy calves	4	5	3	3
Poultry	30	32	83	84
		Percent of farms reporting		
Milk cows	97 1/	97 1/	69	64
Dairy heifers	97	95	62	60
Dairy calves	92	90	64	59
Beef animals	47	41	43	28
Bulls	17	26	8	13
Poultry	47	49	56	54

1/ At least one dairy farmer sold his herd during the year.

Also, dairymen increased their young stock by 1 more head in 1953. Yearly variation in young stock numbers depends upon the number of heifers of suitable breeding born during the year, whether the size of the milking herd is to be increased and whether the quality of the milking herd is to be improved.

Milk production per cow decreased from 8,870 pounds in 1952 to 8,240 in 1953. Most of this decrease is due to 2 major changes in management. First, the greater number of first-calf heifers milked during the year increased the number of milk cows but resulted in temporarily lower average milk production. Second, farmers tried to reschedule freshening dates. Thus, many cows were milked well over a year while others had long dry spells. Even so, there is much room for improvement in the inherent production capacity per cow in many herds. Following is the distribution of herds by average milk production per cow in 1953:

Average milk production per cow (pounds)	Number of herds
Under 7,000	8
7,000 to 8,999	18
9,000 to 10,999	7
11,000 and over	4
Total	37

Large herds and high average production per cow result in large volume sales per farm. About half of the farms sold less than 125,000 pounds of milk (table 2). Five sold over 200,000 pounds. Stateside studies have shown that about 150,000 pounds of milk must be sold per man per year before a specialized dairy farm will provide a family with a satisfactory level of living.

Table 2. Number of farms selling specified amounts of milk, Matanuska Valley, 1953.

Pounds of milk sold per farm	Number of herds
Pounds	Number
Under 100,000	16
100,000 - 125,000	4
125,001 - 150,000	8
150,001 - 175,000	1
175,001 - 200,000	3
Over 200,000	5
Total	37

To produce 150,000 pounds of milk, 22 cows averaging 7,000 pounds would be required but only 17 cows averaging 9,000 pounds would be required. This difference--and resulting efficiency--becomes exceedingly important in Alaska with its shortage of both housing and cropland.

Land Use

The average dairy farm contained 288 acres of which 104 were cropland, 50 were woods pasture, 117 were woods not pastured and 17 acres were in the farmstead and waste (table 3). Thirty-five of the 39 dairymen rented land and 5 rented land to others. The net gain in land rented was 48 acres per farm for all 39 farms. All leased cropland was used for feed crops or potatoes. Some of these leases included woods and woods pasture. Eighteen of the 39 dairymen cleared a total of 214 acres in 1953. This averaged 12 acres on the 18 farms clearing land or 5 acres per farm for all 39 farms.

Table 3. Average acreage per dairy farm and in specified crops and proportion of farms reporting, Matanuska Valley, 1952 and 1953.

Item	Average acreage per farm		Percent of total cropland	
	1952	1953	1952	1953
Number of farms reporting	38	39	38	39
Land use	Acres		Percent	
Cropland				
Potatoes	1	2	1	2
Vegetables & fruit	1/	1/	2/	2/
Small grain	7	8	9	8
Hay	25	34	29	33
Silage	28	30	33	29
Green manure	--	--	--	--
Idle & fallow	3	.2	3	2
Seeded pasture	21	28	25	26
Total cropland	85	104	100	100
Other land				
Native & wood pasture	40	50		
Woods not pasture	97	117		
Other	17	17		
Total land in farms	239	288		

1/ One-half acre or less.

2/ Less than 0.5 percent.

Changes occur yearly in the way dairy farmers use their cropland. The trend has been toward production of more hay, silage and pasture. This is shown by the following percentages of land devoted to these crops:

Year	Percent of total cropland
1947	76
1949	81
1950	83
1951	85
1952	87
1953	88

The first upward trend in acreage devoted to forage was at the expense of potatoes and vegetables, but in 1952, and again in 1953, it was at the expense of the acreage devoted to raising grains. The recent trend toward using more seeded pasture continued with 26 percent of the cropland on dairy farms being devoted to this purpose. It is doubtful that this trend will continue much further.

Favorable prices over the past few years motivated dairymen to grow more potatoes in 1953 than they had since 1949. Some planted potatoes for the first time in several years or in their farming experience. Dairymen who grow potatoes as a part of their farm operations increased their plantings in 1953. The 1953 potato crop year was unprofitable due to market and disease problems, and most dairy farmers lost money on this venture.

During the years of 1951 and 1952, dairymen harvested more winter roughage as silage than as hay. But in 1953, they harvested more feed as hay than as silage. This was the result of 2 conditions. First, more grass mixtures were grown and, since grass makes a better quality hay than does oats and peas, most of it was cut as hay. Second, the summer of 1953 was favorable for curing hay.

Dairymen grew an average of 4.6 acres of feed crops per animal unit 2/. This is one-half acre less than they grew the year before. This decrease in cropland per animal unit reflects the increase in livestock numbers which was not compensated by an equal increase in cropland. It does not reflect a desirable trend unless fertilizer practices are improved to increase average yields per acre. Dairy farms had 2.3 acres of native and woods pasture per animal unit which was about the same as in 1952.

2/ One animal unit is equivalent to the amount of feed consumed by 1 milk cow on a yearly basis. Poultry were not included because most poultry feed on these farms was purchased.

Hay and Silage Production

Seventeen of the 39 dairy farmers bought from $200 to over $3,000 worth of hay. In addition, several reduced roughage allowances in order to winter the herd without purchasing hay. Shipped-in hay has often lost much of its nutritional value besides being very expensive. There still is a need for more homegrown roughage.

Grass hay was more important in 1953 than in 1952. About 41 percent of the acreage cut for hay on the 39 dairy farms in 1953 was a grass mixture. In 1952, it was 25 percent. This mixture was primarily bromegrass although many other kinds of grasses were also grown. The usual custom in harvesting grass is to cut the first crop for hay and to make the second crop into silage or to pasture it. Of the total forage acreage cut for silage, only 3 percent was a grass mixture. The second crop of a few hay fields should be added to this in order to get total grass silage.

Although grass is gaining in acceptance, oat-pea mixtures were the leading roughages stored for winter feeding. Oat-pea mixtures will continue to be the important source of silage for some time. Likewise, oat-pea hay will likely have an important place in the roughage picture although the trend is for less oat-pea acreage cut for hay.

Swedish Select and Victory oats were the most important varieties used in hay and silage mixtures. Other varieties were seldom used. To oats and peas, many farmers added some vetch and a very few added barley, buckwheat or millet. The average seeding rate, around 125 pounds per acre, has varied little since 1949. In 1953, it was 127 pounds of which 95 were oats, 26 were peas, 5 were vetch and 1 was barley, millet or buckwheat. Farmers applied about 100 pounds of fertilizer per acre, mostly 16-20-0 analysis.

In 1953, preparation of the seed bed began on May 5. An early seeding of oats and peas was made on May 8. Most farmers prepared their land and seeded between May 15 and June 26. A late planting was made on July 17. Oats and peas for hay are usually seeded earlier than for silage. However, there are a few who prefer to seed for silage first. An early harvest of silage by the field chopper method was made on July 20, but most of it was harvested between August 15 and Sept. 20. Most of the oat-pea hay was cut with a binder between September 10 and September 30.

Several farmers managed their oats and peas for hay a little different from that for oat-pea silage. They varied the rate of seeding, the rate of fertilization and the seeding date. These differences are not great-

enough to warrant special consideration. At harvest time some of the oats and peas might even be threshed for grain.

Production and harvest of oat-pea hay required 9.3 hours of labor per acre (table 4). Of these, 2.4 were required between May 5 and June 25 for getting the crop planted, 2.7 hours for binding and shocking and 4.2 hours for hauling and storing. Labor requirements for hay production were spread over a fairly long period. Most of the labor to produce silage is needed at harvest time because silage must be stored soon after being cut. It took 7.2 hours of labor per acre to harvest and store silage by the conventional method and 6.5 hours by the field chopper method. The field chopper took less time and the work was much lighter than when silage was made by the conventional method. The conventional method involves cutting the silage with a binder, picking up the bundles and loading on a truck by hand, hauling to the silo, and unloading the bundles by hand onto a stationary chopper.

Tractors were used 3.3 hours per acre on hay, 5.4 hours per acre on silage harvested by the conventional method and 4.9 hours per acre for silage harvested by field chopper. In 1953, it cost about the same on an acre basis to harvest silage by the field chopper method as it did to harvest by the conventional method. The costs were $66.20 for the former and $66.65 for the latter (table 5). For oat-pea hay, it was $56.60. None of these totals include overhead costs.

There is a temptation to look at only the cash costs when making comparisons between machines or farming methods. However, the farmer's time, wear and tear on equipment, cash investment, and many other so-called non-cash costs must be considered. The farmer is concerned with managing and selling his own labor for the highest return. If he gets a low return for his labor, he likely will not do the job very many times. Those who continuously get low returns are usually farming on a subsistance level and their total production is small.

Expenses and Income

Purchased feed, the greatest single expense, amounted to $3,317 per farm and was about one-fourth of the $13,487 total farm cash expense (table 6). Machinery purchases were second, costing $1,537. This large expenditure for machinery represents an attempt by farmers to increase their efficiency and to lower labor costs. With larger machines and tractors they will be able to work larger acreages more easily and quickly with about the same amount of labor.

Hired labor amounting to $1,217 per farm was the third greatest expenditure. The farm wage rate increased in 1953 from $1.75 to

Table 4. Average labor and tractor requirements per acre of hay and silage by operation, Matanuska Valley, 1953.

Operation	Man hours	Tractor hours
	Hours	Hours
Pre-harvest		
Plowing	0.9	0.9
Disking	0.4	0.4
Harrowing	0.3	0.3
Seeding, fertilizing and packing	0.8	0.8
Other	1/	1/
Total pre-harvest	2.4	2.4
Harvest		
Binding hay	1.6	0.9
Shocking hay	1.1	---
Storing hay	4.2	2/
Binding silage	1.7	1.0
Storing silage	5.5	2.0 3/
Silage by chopper	6.5	2.5 4/
Total harvest		
Hay	6.9	0.9
Silage by conventional method	7.2	3.0
Silage by chopper	6.5	2.5
Total all operations		
Hay	9.3	3.3
Silage by conventional method	9.6	5.4
Silage by chopper	8.9	4.9

1/ Less than .05 of an hour.

2/ Truck and tractor time for hauling 1.8 hours.

3/ Truck time for hauling 2.5 hours, stationary chopper time 1.0 hour.

4/ Truck time 2.2 hours, chopper time 1.4 hours, blower time 1.0 hour.

Table 5. Average costs per acre of producing hay and silage, Matanuska Valley, 1953.

Expense items	Quantity per acre	Unit cost	Average cost per acre
	Pounds	Dollars	Dollars
Supplies and materials			
Fertilizer	117.0	7.10	8.31
Seed	127.0	9.17	11.64
Binder twine	3.2	0.39	1.25
Total			21.20
Labor and equipment	Hours		
Hay			
Labor	9.3	2.00	18.60
Tractor	3.3	2.50 1/	8.25
Truck	1.8	2.50 1/	4.50
Binder	0.9	4.50 1/	4.05
Total hay			35.40
Silage by conventional method			
Labor	9.6	2.00	19.20
Tractor	5.4	2.50 1/	13.50
Truck	2.5	2.50 1/	6.25
Binder	1.0	4.50 1/	4.50
Stationary chopper	1.0	2.00 1/	2.00
Total silage, conventional method			45.45
Silage by field chopper			
Labor	8.9	2.00	17.80
Tractor	4.9	2.50 1/	12.25
Truck	2.2	2.50 1/	5.50
Chopper	1.4	6.50 1/	9.10
Blower	1.0	2.00 1/	2.00
Total silage, field chopper method			46.65
Total cost of production			
Hay			56.60
Silage harvested by conventional method 2/			66.65
Silage harvested by field chopper 2/			66.20 3/

1/ Unit cost based on custom rate.

2/ Data is insufficient for comparing cost of these 2 methods.

3/ Does not include $1.25 for binder twine as in above totals.

$2.00 per hour, or about 14 percent. Also, several farmers increased the size of their operations during the year and required additional help.

Fertilizer, the fourth largest expense, amounted to $855 per farm or about $8.50 per acre of cropland. Other expenses amounting to over $500 each, in order of importance, were livestock and poultry purchases, seed, custom work, fuel and oil, rent, machinery repairs, and interest on borrowed capital.

Milk sales, including co-op overage 3/ which arises out of milk sales, made up 88 percent of gross cash income received by dairy farmers. Potatoes were the second important source of cash income followed by livestock and egg sales. All other sources of cash income from farm operation amounted to an average of only $369 per farm.

The net return from farming averaged $4,843 on the 38 dairy farms. This was increased by $517 of non-farm income which gives a total of $5,360 for the year's work and use of invested capital. The range in net returns from farming was from a loss of more than $7,000 to a net gain of over $14,000. Five of the 38 farms suffered net losses, 8 netted from $1 to $2,999, 10 netted from $3,000 to $5,999 while 15 netted over $6,000. Out of this income must be paid any returns to investments in the farm and wages to the family for management and labor.

Minor Enterprises and Secondary Products

Only 12 percent of the average dairy farmer's income came from potatoes, livestock, eggs, rents, custom work, agricultural conservation program and from other sales. However, on several farms these minor sources of income were very important. They brought farm operations up to a scale which would satisfactorily support a farm family. Potatoes and poultry were the most important secondary enterprises in this respect. Livestock sales often were a by-product of dairying. A drop in the price of local beef meant that milk cows no longer of much value for milking purposes were of little value as beef. No meat processing plants were available to utilize this low-priced meat.

Custom work was insignificant as a source of income on most dairy farms. This practice does not fit into the farmer's work schedule. Joint ownership of machinery and exchange work occurs frequently.

3/ Co-op overage is an adjustment made with dairy farmers for milk sold in excess of base volumes.

Table 6. Summary of expenses and income, 38 dairy farms, Matanuska Valley, 1953.

Farm expenses	Amount	Farm income	Amount
	Dollars		Dollars
Cash		Cash	
Feed	3,317	Direct sales	
Machinery purchases	1,537	Milk	13,353
Labor	1,217	Potatoes	950
Fertilizer	855	Livestock	417
Livestock & poultry purchases	791	Eggs	269
Seed	735	Other	89
Custom work	690	Total direct sales	15,078
Fuel & oil	687	Non-direct sales	
Rent	673	Co-op overage	822
Machinery repairs	617	Rents, custom work, A.C.P., & other	280
Interest	576	Total cash income	16,180
Electricity	274		
Veterinary & breeding	242	Non-cash returns	
Hauling	213	Increase in livestock inventory	731
Building improvements	180	Increase in machinery inventory	880
Insurance	158	Gross returns	17,791
Taxes	149		
Licenses	32	Less farm expenses	13,849
Miscellaneous	544	Net returns	3,942
Total cash expense	13,487		
Non-cash		Products for home consumption	901
Decrease in building inventory	362		
Total expenses	13,849	Net returns for farming	4,843 1/

1/ Average non-farm income on 30 farms reporting was $517.

Factors Affecting Income on Dairy Farms

In order to find what factors influence income under Alaskan conditions, detailed analysis is necessary. The 38 farms were grouped 4 ways for comparison. The 14 farms returning the lowest net returns were put in one group, the 14 farms returning the highest in another, the 8 farms in between were put into another group. Two farms from which milk was sold only part of a year were not analyzed. From these comparisons, some factors could be isolated as affecting net farm returns.

Farmers in group I (low returns) realized a net return of $1,148 from their farm operations (table 7). This was almost $8,500 less than the $9,566 net farm income realized by farmers in group III having the highest incomes. Farmers in group II (medium returns) realized an average of $4,979. The most outstanding difference between groups I and III (low and high return groups) was that farmers in group III received more than twice as much from farm sales as did farmers in group I but their expenses were only slightly more than half again as much. Their milk sales were twice group I milk sales and their potato sales about 6 times those of group I. They received $4.54 from milk sales for every $1 spent for feed as compared with $3.41 received by farmers in group I. They spend about $10 per acre for fertilizer as compared with $7.88 spent by group I. Farms included in group III were larger by about one-half than those in group I. Expenditures made by group III farmers for livestock and poultry purchases, seed, custom work, interest, electricity, veterinary and breeding and licenses were less than 1.5 times what group I farmers spent for these items. Group I farmers actually spent more for livestock and poultry purchases. This reflects their attempt to build up their capital.

Average milk production per cow on group I farms was only 6,944 pounds, over 2,000 less than the 9,037 pounds on group III farms. Average milk production on group II farms was 8,427 pounds per cow or about half way between groups I and group III. Seven cows on group III farms were as good as 9 cows in group I. Of all factors studied, average production per cow was one of the most important. Some of the factors that influence milk production are: feed, management and care, inherent capacity of the individual cow, health, period of lactation, and housing.

The farms returning the lowest income also had fewer cows. Group I farmers had 14 cows per herd as compared with 21 cows per herd on group III farms (table 8). The greater herd size was one of the more important factors influencing income. In conjunction with a high average milk production per cow, it made possible selling a large volume of milk. However, these two factors alone are not the only ones influencing

Table 7. Summary of income and expenses, 36 dairy farms, by income groups, Matanuska Valley, 1953

Farm expenses	Group I 14 low income	Group II 8 medium income	Group III 14 high income
	Dollars	Dollars	Dollars
Feed	2,793	2,832	4,357
Machinery purchases	1,380	838	2,314
Labor	1,118	701	1,718
Fertilizer	638	674	1,239
Livestock & poultry purchases	795	215	573
Seed	756	565	859
Custom work	561	1,022	593
Fuel & oil	590	691	833
Rent	287	698	1,142
Machinery repairs	489	359	865
Interest	659	343	660
Electricity	275	242	308
Veterinary & breeding	243	193	285
Hauling	227	276	189
Building improvements	88	146	317
Insurance	114	94	246
Taxes	115	119	214
Licenses	27	45	28
Miscellaneous	395	543	742
Total expenses	11,550	10,596	17,482
Farm income			
Cash-direct sales			
Milk	9,530	11,227	19,801
Potatoes	318	788	1,811
Livestock	378	263	345
Eggs	254	430	224
Other farm sales	61	1	181
Total direct sales	10,541	12,709	22,362
Non-direct sales			
Co-op overage	633	767	1,068
Rents, custom work, & other	122	143	486
Total cash income	11,296	13,619	23,916
Non-cash returns			
Net change in inventories	604	1,151	2,094
Gross returns	11,900	14,770	26,010
Less farm expenses	11,550	10,596	17,482
Net returns	350	4,174	8,528
Products for home consumption	798	805	1,038
Net returns from farming	1,148	4,979	9,566

income. The cost side of the picture is extremely important also. Cost of milk production will be discussed later.

Farmers with the greatest income had fewer hens than farmers in group I. They had 12 head of young stock as compared with 9 head on the lower income farms.

Table 8. Average livestock numbers per farm on 36 dairy farms, by income group, Matanuska Valley, 1953.

Kind of livestock	Group I 14 low income	Group II 8 medium income	Group III 14 high income
	Number	Number	Number
Milk cows	14	13	21
Dairy heifers	5	5	6
Dairy calves	4	4	6
Poultry	35	47	28

Cropland and Income Farmers in group I had an average of 4.6 acres of cropland per animal unit in field crops, and farmers in group III had 4.4 acres. Farmers in both income groups I and III had 2.4 acres per animal unit of native and woods pasture. Group III had 0.2 acres less seeded pasture per animal unit than did group I. They had more hay but this was offset by farmers in group I having more silage. Both groups had the same grain acreage per animal unit. Farmers in group I produced an average of 1,054 pounds of milk per acre in feed crops, but farmers in group III produced 1,576 pounds. With cropland as valuable as it is in the Matanuska Valley, this is important. Soil fertility and use of fertilizer are important factors influencing yield. Farmers in group I spent less per acre of cropland for fertilizer than farmers in group III. In most instances, the additional production could be put to good use by being fed to the same number of cows and thus increase production per cow. Many farmers would feed much more roughage during the winter months if they had it to feed. Isolated cases are known where individual cows have doubled their milk production as a result of improved feeding and care.

Investment and Income Farmers in group I had $19,313 invested in livestock, buildings and machinery, farmers in group II had $16,942, and farmers in group III had $26,045 invested (table 9). Investment per milk cow gives a better comparison because the farms in group III were larger than farms in group I. The farmer's investments in the higher income group amounted to $1,240 per milk cow compared to $1,380 for the lower income group. When the range in size is considered, investments in both machinery and service buildings usually will increase with the size of the herd but as an indirect proportion on a per cow basis. Investments in livestock and land, not considered here, can be expected to increase at about the same direct rate as increases in herd size.

Table 9. Average capital investment in livestock, machinery and buildings by income groups, 36 dairy farms, Matanuska Valley, 1953.

Item	Group I 14 low income	Group II 8 medium income	Group III 14 high income
	Dollars	Dollars	Dollars
Livestock	6,670	6,376	9,946
Equipment and machinery	4,523	3,768	7,243
Service buildings	8,120	6,798	8,856
Total	19,313	16,942	26,045
Average investment per milk cow	1,380	1,303	1,240

Costs Per Milk Cow

It cost 25 farmers an average of $664.11 in cash costs and depreciation to keep each producing cow for the year 1953 (table 10).

The average cash cost of keeping the cow was $628.96. Of this $202.02 was for purchased feed including $17.07 for hay. This purchase of hay reflects a weakness in farm organization on many farms. It is an area where farm costs can be reduced. Labor cost, amounting to almost $60, might possibly be another area for cost reduction on some farms.

The average cow on these 25 farms produced 8,333 pounds of milk. Assuming the price of milk at $10.00 per hundredweight, it took the first 6,290 pounds she produced to pay her keep for the year. This leaves a little over 2,000 pounds of milk to pay the farmer for his labor, his family's labor and the interest on his capital.

Table 10. Average production costs per milk cow per year and per 100 pounds of milk on 25 dairy farms, Matanuska Valley, 1953 1/ (modified farm basis)

Item	Cost per cow per year	Cost per 100 lbs. of milk
	Dollars	Dollars
Purchased feed		
Concentrates	184.95	2.22
Hay	17.07	0.20
Total	202.02	2.42
Other cash costs		
Labor	59.65	0.72
Rent	47.77	0.57
Fertilizer	46.85	0.56
Seed	40.46	0.49
Machinery repairs	39.72	0.48
Fuel and oil	38.41	0.46
Interest paid	31.00	0.37
Custom work	27.39	0.33
Electricity	17.11	0.19
Veterinary and breeding	14.63	0.18
Taxes	11.00	0.13
Hauling	10.93	0.13
Insurance	10.59	0.13
Licenses	1.60	0.02
Miscellaneous	29.83	0.36
Total cash costs	628.96	7.54
Overhead		
Cost of machinery	34.60	0.42 2/
Cost of buildings	31.41	0.38 3/
Sub-total	694.97	8.34
Livestock appreciation	30.86	0.37 4/
Cost per 100 pounds of milk		7.97
Cost per milk cow per year	664.11	

1/ Cost of family labor and interest on family capital in the business are not included.

2/ Computed by value of machinery at the beginning of the year plus machinery purchases minus machinery sales written off over a period of 10 years.

3/ Computed by value of buildings at beginning of the year plus improvements written off over 16 years.

4/ Computed as follows: Increases in livestock inventory of December 31, 1953 over January 1, 1953 plus returns from livestock sales, less cost of purchased livestock.

Cost of Producing Milk

The average cash and depreciation cost of producing milk on 25 farms was $7.97 per hundredweight (table 10). Of this amount, $2.42 was for purchased feed. This, plus labor, rent, fertilizer, seed, machinery repairs and fuel and oil accounted for $5.70 or 72 percent of the total cost. Usually greatest savings can be made among the larger cost items. Savings in one item might affect other cost items. For example, the use of bromegrass hay will reduce the bills for seed, machinery repairs, fuel and oil, and purchased feed. It might also affect labor, rent, interest paid, and custom work. It will increase fertilizer cost.

The cost of producing 100 pounds of milk on these 25 farms ranged from a low of $4.07 to a high of $13.97 per hundredweight (table 11). Two out of each 5 farmers had production costs in excess of $8.00 per hundredweight. Roughly 1 in 4 had costs of $6.00 or less per hundredweight. Three of the four farmers with costs of over $11.00 per hundredweight experienced losses from their farm operations for the year.

Information related to costs of production is listed in table 11. Two points are readily noticeable in this table. First, farmers who produce milk cheaply do not always have high farm incomes as illustrated by farmers 2 and 13. The limited amount of milk sold in these two instances was the reason why net returns were so low.

Second, the cost of production on these 25 farms did not vary directly with any one performance factor observed such as size of herd or amount of cropland. On most farms one of several factors accounted for the variations in costs. On farms with a high cost of production, more than one item was usually at fault.

Of the four high cost farms, 2 had very low production per cow, 2 had much below average sized herds, 2 had much below average cropland per animal unit, 2 had much below average crop yields and 2 fed far more purchased grain than average. Farmer number 25 with the highest cost per hundredweight had a little above average milk production but had 26 percent less cropland than average, had crops yields 25 percent below average and tried to make up for his lack of home grown roughage through greater use of concentrates. He was the heaviest user of purchased grain. By having one of the smallest herds, he managed to minimize losses for the year. Farmer number 24 had next to the highest cost per hundredweight of milk produced and also experienced losses for the year. His average milk production per cow was the lowest among the 25 farms. High labor and interest cost per unit of production could have been reduced through higher production per cow. Farmer number 23 had below average milk production, below average size of herd, below average crop yields and bought much more feed than average. Cropland per animal unit was above average but his yields were low

Table 11. Production cost per 100 pounds of milk, net income from farming and related factors on 25 dairy farms, Matanuska Valley, 1953.

Farm No.	Cost per 100 lbs. of milk	Net income from farming	Average production per cow	Number of milk cows	Purchased		Fertilizer	Cropland per animal unit	Crop yield index 1/
					Concentrates	Hay			
	Dollars	Dollars	Percent of average						
1	4.07	9379	94	87	24		113	102	118
2	5.27	5362	76	87	119			94	65
3	5.48	8993	118	90	58		54	106	95
4	5.92	7430	97	105	62	345	75	75	112
5	5.93	7331	139	64	114		91	135	143
6	5.95	6011	106	55	43	295	145	100	100
7	6.42	11105	72	183	95	25		137	85
8	6.72	8882	106	93	51		263	86	143
9	6.98	4945	103	99	123	170	73	105	61
10	7.03	4745	124	84	106		23	102	128
11	7.10	10191	116	140	148	545	66	79	61
12	7.77	11456	97	2/	75		141	79	153
13	7.90	1998	104	47	123	145	39	82	92
14	7.92	3035	89	61	104	125	171	116	57
15	7.93	8825	133	113	89		86	76	165
16	8.26	5718	120	81	118		218	79	106
17	8.94	8335	102	189	105		125	83	87
18	9.08	2939	121	52	149	550	143	104	103
19	9.10	7124	147	90	79	265	150	137	114
20	9.48	1060	66	49	25		27	73	127
21	9.96	3004	98	78	118		164	161	100
22	11.24	- 937	95	148	131		64	112	127
23	11.66	639	64	76	162		79	129	74
24	12.53	- 1031	58	160	104	115	63	78	104
25	13.97	- 1609	103	47	223		89	74	75
Average	7.97	5397	100	100	100	100	100	100	103

1/ Percent of 1953 weighted yields compared with 5 year average weighted yield on surveyed farms in the Matanuska Valley.

2/ Omitted intentionally.

because he failed to fertilize sufficiently and follow good cropping practices. Labor cost on farm number 22 was 4 times the average of all 25 farms. This was the greatest single factor causing high cost on this farm.

The cost of feed was excessive on 4 farms, of labor on 4 farms, of interest paid on 2 farms, and of custom work on 1 farm. On 3 of the 4 highest cost farms, 2 to 3 of these cost items were out of line. Crop yields on six farms were 25 percent or more below average.

An important area for reducing the cost of producing milk lies in feed management. Six of the 10 farmers with the lowest costs spent less than average for concentrates whereas only 2 of the 10 farmers with the highest costs spent less than average for concentrates. Farmer number 1, who produced milk the cheapest, grew about all his own feed as well as keeping other costs down. He got better than average yields and had average cropland per animal unit. His milk production was only 6% below average and he had 13% less cows than average. His net returns were almost 75 percent above average for the other 25 dairymen.

Farmer number 2, with the next to the lowest cost, appears to be an exception. He bought no fertilizer, had no hauling expense, had very little hired labor, licensed no vehicle, paid no rent and paid no taxes chargeable against 1953 operations. Most other expenses were low. His production per cow was low and his crop index was very low. He was not spending much money, but he was not earning as much as other farmers with fewer cows and with higher costs per hundredweight. Having low production costs does not insure a high net return. This is especially true if good management practices are ignored.

The importance of selling a large volume of milk, as well as keeping costs in line, can be seen by comparing farmers 13, 14 and 15. Each farmer produced milk for about $7.92 per cwt. However, their net returns from farming were $1,998, $3,035, and $8,825 respectively. Farmer number 15 had far better production per cow and far more cows thus yielding a greater volume of milk. Also, farmer number 15 had fewer acres of cropland per animal unit but his higher crop yields more than offset a shortage of cropland.

Farmers 4 and 5 with the same cost of production per 100 pounds of milk, made virtually the same net income from farming but did so with different farm organizations. Farmer number 5 had 41 percent fewer milk cows but 41 percent greater milk production. In addition, farmer number 5 had more cropland, a higher yield per acre and purchased more grain. Farmer number 4 purchased some hay where farmer 5 did not. Also, farmer 4 was below average by more than 5 percent only in acres of cropland per animal unit. The two had average net returns from farming of about $7,400 and average costs of $5.92 per hundredweight of milk.